## REMARKS

Favorable reconsideration of this application is respectfully requested.

Claims 23-31 are pending in this application. Claims 11 and 16-22 are canceled by the present response and claims 23-31 are added by the present response. Claims 11, 16, 21, and 22 were rejected under 35 U.S.C. § 102(b) as anticipated by U.S. patent 5,387,555 to Linn et al. (herein "Linn"). Claims 17-20 were rejected under 35 U.S.C. § 103(a) as unpatentable over Linn in view of U.S. patent 5,877,070 to Goesele et al. (herein "Goesele").

Addressing the above-noted rejections, those rejections are traversed by the present response.

Initially, applicants note previously pending claims 11 and 16-22 are canceled by the present response and new claims 23-31 are presented for examination. New claims 23-31 are believed to be self-evident from the original disclosure and the previously pending claims, and thus are not deemed to raise any issues of new matter.

New claims 23-31 are based on previously pending claims 11 and 16-22 except that new claims 13, 23-31 make certain clarifications. More particularly, certain of new claims 23-31 now recite creating an electrically conducting bonding between a face of a first semiconductor element and a face of a "semiconductor film". Further, new claims 23-31 now also more positively recite "no insulator layer being interposed between the two faces such that the semiconductor film is not electrically insulated from the first semiconductor element". New dependent claim 30 recites specifics of the first and second semiconductor element, the interposed layers, and thicknesses of such layers. That subject matter is fully supported by the original specification at page 7, lines 23-26. New independent claim 31 also recites the at least one oxide layer having a thickness of a few angstroms. That feature is supported by the original specification for example at page 10, line 29.

The claims as currently written are believed to distinguish over the applied art.

Linn is directed to a method of creating an electrically conducting bonding between a face of a first semiconductor element and a face of a second semiconductor element by heat treatment.[1] Further, Linn discloses depositing at least one layer of a material on a face of a first semiconductor element and at least one layer of material on a face of a second semiconductor element.[2] However, in Linn these layers made of an electrical conductor material (platinum, cobalt, or tungsten) and of a semiconductor material (polysilicon) are not deposited directly on the two semiconductor elements. In Linn electrically insulating layers (oxide layers) 316, 406, 413, 516, 513 are interposed between these layers and the two semiconductor elements.

The applicants of the present invention recognized that certain bonding solutions result in the consumption of a part of a semiconductor film, which may be disadvantageous in the case of very thin films, and also result in the diffusion of a metal into a semiconductor, which can degrade its properties.[3]

In contrast to the above-noted features recited in Linn, each of the claims as currently written now recites carrying out a heat treatment for combining the deposited layers to form one layer that provides electrically conducting bonding between the two faces, "no insulator layer being interposed between the two faces such that the semiconductor film is not electrically insulated from the first semiconductor element", as now specifically required in new independent claim 23, and as similarly required in new independent claims 29 and 31.

Such a feature as discussed above is believed to clearly distinguish over the teachings in Linn as Linn requires the use of the noted insulating layers.

One basis for maintaining the outstanding rejection was that the previously submitted arguments argued features not relied upon in the claims. Specifically, one basis for maintaining the outstanding rejections states "...it is noted that the features upon which

[1] See Linn at col. 1, lines 1-15.
[2] See Linn in Figs. 3A, 5A, and col. 3, lines 49-56.
[3] See, for example, the present specification at page 2, lines 20-26.

applicants relies (i.e., when no insulating layers are provided between the deposited layers and the semiconductor elements) are not recited in the rejected claim(s)".[4]

In response to that basis for maintaining the rejection, applicants note the above-noted features are now clearly reflected in each of the new claims.

Further with respect to new independent claims 23 and 31, those claims recite creating electrical conducting bonding between a "face of a first semiconductor element and a face of a semiconductor film included in a second semiconductor element". To meet that limitation, the outstanding rejection appears to reference thermal oxide layers 406, 506, which have a thickness of 500 Å. However, in that respect applicants note such layers are insulating layers and do not correspond to a "semiconductor film". In such ways, new independent claims 23 and 31, and the claims dependent therefrom, further distinguish over the teachings in Linn.

Further, with respect to new independent claim 31, that claim also recites "forming at least one oxide layer onto at least one of said deposited conductive layers ***with a thickness of a few angstroms***". That feature is believed to further distinguish over the teachings in Linn.

As noted in the present specification at page 10, line 29 et seq., the at least one oxide layer has a thickness of only a few angstroms for not electrically insulating the second semiconductor element. Linn does not teach or suggest such a feature. In Linn the oxide layer 506 is the thinnest insulating layer separating the second semiconductor element 502 from the electrical bonding, and this oxide layer 506 has a thickness of 0.05 μm (Linn at col. 6, lines 40-49). Thereby, the oxide layer 506 in Linn does not have a thickness of a few angstroms, and in fact is not even thin enough for forming, after reaction, isolated precipitates as also recited in the claims.

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[4] Office Action of March 23, 2005, page 5, last full paragraph.

Applicants also draw attention to new dependent claim 30, which recites specific properties of the first and second semiconductor elements and layers therein. Such features are believed to also additionally distinguish over the applied art to Linn.

Moreover, applicants respectfully submit no teachings in Goesele can overcome the above-noted deficiencies in Linn.

The teachings in Goesele were not cited with respect to the above-noted features, and are not believed to overcome the above-noted deficiencies in Linn. Moreover, applicants respectfully submit that it would not have been obvious to one of ordinary skill in the art to combine the teachings of Goesele to those of Linn.

Goesele teaches forming a thin film on a first element by:

(1) forming microcavities in the second semiconductor element by ionic implantation;[5]

(2) bonding the second semiconductor element to the first element;[6]

(3) heat treating for detaching the thin film from the second semiconductor element at the microcavities level.[7] The second semiconductor element is of Si, Ge, diamond, SiC, alloys of Si and Ge with C, or other materials.[8]

Thereby, the use of SiC in the bonding process was known from Goesele. However, if we consider that the above-noted step (2) of bonding is an anodic bonding, the first element being of glass or quartz, it is clear that the teachings of Goesele are very different from a technique of electrical conducting bonding such as disclosed in Linn and in the present invention.

Applicants respectfully submit one of ordinary skill in the art would not have applied the teachings of Goesele for solving problems of consumption of a part of a second

[5]See Goesele at column 6, lines 15-20; column 10, lines 13-30; and column 12, lines 6-11.
[6]See Goesele at column 4, lines 65-67; column 7, lines 59-65; and column 12, lines 13-16.
[7]See Goesele at column 5, lines 1-19; column 10, line 65 - column 11, line 7; and column 12, lines 16-18.
[8]See Goesele at column 3, lines 50-56.

semiconductor element and a diffusion of metal element into it during a heat treatment for an electrical conducting bonding, if no insulating layer protects the second semiconductor element, as Goesele is not directed to solving such problems or even recognizing such problems.

Moreover, applicants note there is no suggestion in any cited art as to how to perform an electrical conducting bonding between two semiconductor elements without a protection layer for the second semiconductor element, and without consuming a part of the second semiconductor element or diffusing metal into it. It is only the applicants of the present invention who recognized such problems and who solved such problems by the claimed invention.

In view of these foregoing comments, applicants respectfully submit the claims as currently written distinguish over the applied art to Linn, further in view of Goesele.

As no other issues are pending in this application, it is respectfully submitted that the present application is now in condition for allowance, and it is hereby respectfully requested that this case be passed to issue.

Respectfully submitted,

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